

67. (New) A method as in claim 34 wherein said applying occurs before said singulating.

**REMARKS**

Claims 2, 13, 35, 39, and 45 have been cancelled without prejudice, claims 1, 3, 6-12, 14-20, 23-29, 31-34, 36, 37, 40-44, 46-52, 55-59, 61, and 63-65 have been amended, and claims 66 and 67 have been newly added. Claims 1, 3-12, 14-34, 36-38, 40-44, and 46-67 are now pending in the application. Applicants respectfully request reexamination and reconsideration of the application as amended.

Claims 1-65 have been rejected in view US Patent No. 6,219,908 B1 to Farnworth et al. ("Farnworth") by itself or in combination with other references, including US Patent No. 5,131,535 to O'Connor et al. ("O'Connor") and US Patent No. 6,147,316 to Beffa ("Beffa"). Applicants respectfully assert that the claims as amended patentably distinguish over the cited art.

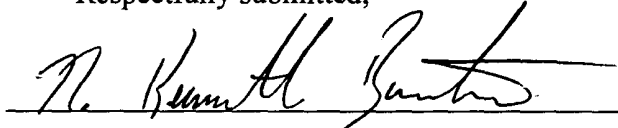
Independent claims 1 and 34 recite a method in which semiconductor dice are singulated from a wafer or wafers, placed unpackaged in a carrier, and tested. In claim 1, an identification code uniquely identifying each of the dice in the carrier is applied to the carrier. In claim 34, an identification code uniquely identifying each dice is applied to each dice. With respect to claim 1, Farnworth fails to teach applying an identification code to a carrier much less an identification code that uniquely identifies each of a plurality of unpackaged dice in the carrier. With respect to claim 34, Farnworth fails to teach applying an identification code to a die that uniquely identifies the die. O'Connor and Beffa disclose nothing more than well known backend processing of **packaged** semiconductor devices; they teach nothing regarding processing of **unpackaged** semiconductor dice. Thus, none of Farnworth, O'Connor, or Beffa by itself discloses the invention recited in claims 1 and 34, nor is there any incentive or motivation in any of these references to selected particular portions from each reference and combine the selected portions in such a way as to reach the invention of claims 1 and 34. Therefore, claims 1 and 34 and the claims that depend there from patentably distinguish over Farnworth, O'Connor, Beffa, and the other cited references.

In view of the foregoing, Applicants respectfully submit that the instant application is in condition for allowance. Reconsideration of the application is respectfully requested, and early allowance of the claims as amended is solicited.

Although Applicants believe that no extension of time is needed and no fees are due, Applicants petition the Commissioner for any extension of time deemed necessary for acceptance of this paper, and Applicants authorize the Commissioner to charge any fee deemed necessary for acceptance of this paper (including the fee for any extension of time) to Deposit Account No. 50-0285 (order no. P90-US).

Respectfully submitted,

Date: January 3, 2002

A handwritten signature in black ink, appearing to read "N. Kenneth Burraston", is written over a horizontal line.

N. Kenneth Burraston  
Registration No. 39,923

FormFactor, Inc.  
Legal Department  
2140 Research Dr.  
Livermore, CA 94550  
925-456-7355  
925-294-8147 Fax

**VERSION WITH MARKINGS TO SHOW CHANGES**

1. (Amended) A method [for processing at least one die which comprises an integrated circuit, said method] comprising:

singulating at least one semiconductor wafer into a plurality of singulated dice, each said die comprising an integrated circuit;

applying an identification code to a carrier, said identification code uniquely identifying each of a plurality of said singulated dice;

depositing [a singulated die] said plurality of said singulated dice unpackaged into said carrier[, said singulated die comprising an integrated circuit, said carrier holding said singulated die]; and

testing said singulated dice while deposited in said carrier.

3. (Amended) A method as in claim 1 wherein said identification code comprises information identifying said at least one semiconductor wafer[ in a specific lot of wafers].

6. (Amended) A method as in claim 1 further comprising[:] applying a die identification code to each of said singulated [die] dice, each said die identification code comprising information relating to said die to which said die identification code is applied.

7. (Amended) A method as in claim 6 wherein each said die identification code comprises information identifying the semiconductor wafer from which said [singulated] die was [created] singulated.

8. (Amended) A method as in claim 7 wherein each said die identification code is applied to said [singulated] die after said [singulated die is] dice are deposited into and secured in said carrier.

9. (Amended) A method as in claim 7 wherein each said die identification code further comprises information identifying a particular wafer processing lot in which the semiconductor wafer from which said die was singulated was created.

10. (Amended) A method as in claim 8 wherein said die identification code is applied to said [singulated] die through an opening in said carrier.
11. (Amended) A method as in claim 1 wherein said [carrier secures said singulated die during] testing comprises a burn-in testing[ of said singulated die].
12. (Amended) A method as in claim [11] 1 wherein said carrier secures said [singulated die] dice during use of said [singulated die] dice after said [burn-in] testing and said carrier acts as a final package for said [singulated die] dice.
14. (Amended) A method as in claim 1 further comprising[:] mounting a plurality of elongate, resilient electrical contact elements on contact pads of said [singulated die] dice.
15. (Amended) A method as in claim 14 wherein said plurality of elongate, resilient electrical contact elements are mounted prior to depositing said [singulated die] dice into said carrier.
16. (Amended) A method as in claim [15] 1 further comprising[:] applying a top on said carrier after depositing said [singulated die] dice into said carrier.
17. (Amended) A method as in claim [15] 14 further comprising[:] mounting said carrier onto a substrate having a plurality of electrical contact pads.
18. (Amended) A method as in claim 17 wherein said carrier is mounted on said substrate prior to depositing said [singulated die] dice onto said carrier.
19. (Amended) A method as in claim [18] 17 wherein said carrier is mounted on said substrate after depositing said [singulated die] dice onto said carrier.

20. (Amended) A method as in claim 17 wherein each of said contact pads on said [singulated die] dice are electrically coupled to a corresponding one of said plurality of electrical contact pads on said substrate through a corresponding one of said elongate, resilient electrical contact elements.

23. (Amended) A method as in claim 17 wherein said substrate is a test printed circuit board which is used [to test said singulated die] in said testing.

24. (Amended) A method as in claim 17 wherein said substrate is a final package unit for said [singulated die] dice.

25. (Amended) A method as in claim 17 wherein said substrate is used [to test said singulated die] in said testing, and if said [singulated die passes] dice pass said testing, said substrate is used to package said [singulated die] dice for use.

26. (Amended) A method as in claim 25 wherein if said [singulated die fail] dice fail said testing, said [singulated die is] dice are removed from said carrier and [another singulated die is] other dice are deposited into said carrier.

27. (Amended) A method as in claim [2] 1 wherein said identification code comprises information identifying said at least one semiconductor wafer [in a specific processing lot of wafers] and wherein said method further comprises:

[exposing said singulated die, while secured in said carrier, to a burn-in testing environment;]

characterizing said [singulated die] dice based on said [exposing] testing;  
reading said identification code.

28. (Amended) A method as in claim [27] 1 wherein said reading occurs after said characterizing[ and wherein said reading identifies said specific processing lot].

29. (Amended) A method as in claim 27 further comprising:

mounting, prior to said [exposing] testing, a plurality of elongate, resilient electrical contact elements on contact pads of said [singulated die] dice;

mounting, prior to said [exposing] testing, said carrier onto a substrate having a plurality of electrical contact pads, wherein each of said contact pads on said [singulated die] dice are electrically coupled to a corresponding one of said plurality of electrical contact pads on said substrate through a corresponding one of said elongate, resilient electrical contact elements.

31. (Amended) A method as in claim 29 wherein each of said elongate, resilient electrical contact elements is compressed less during said [exposing] testing than during final use of said [singulated die] dice.

32. (Amended) A method as in claim 20 wherein each of said elongate, resilient electrical contact elements is compressed less during said [exposing] testing than during final use of said [singulated die] dice.

33. (Amended) A method as in claim 20 further comprising removing said [singulated die] dice from said carrier after said testing [said singulated die] and packaging said [singulated die] dice for use.

34. (Amended) A method [for processing at least one die which comprises an integrated circuit, said method] comprising:

singulating at least one semiconductor wafer into a plurality of singulated dice, each said die comprising an integrated circuit;

applying an identification code to [a die] each of said dice, each said identification code uniquely identifying the die to which said identification code is applied;

depositing [said die] a plurality of said singulated dice unpackaged into said carrier[, said die comprising an integrated circuit, said carrier holding said die in a singulated form]; and  
testing said singulated dice while deposited in said carrier.

36. (Amended) A method as in claim 34 wherein each said identification code comprises information identifying [at least one] the semiconductor wafer [in a specific lot of wafers] from which said die was singulated.

37. (Amended) A method as in claim [36] 34 wherein each said identification code comprises at least one of a bar code or a code stored in a memory device on said carrier.

40. (Amended) A method as in claim [39] 34 wherein each said identification code is applied to said [die] dice after said [die is] dice are deposited into and secured in said carrier.

41. (Amended) A method as in claim [39] 34 wherein each said identification code [further] comprises information identifying a particular wafer processing lot in which the wafer from which said die was singulated was created[ and said identification code is applied before said die is singulated].

42. (Amended) A method as in claim [40] 42 wherein each said identification code is applied to said [die] dice through an opening in said carrier.

43. (Amended) A method as in claim 34 wherein said [carrier secures said die during] testing comprises a burn-in testing[ of said die].

44. (Amended) A method as in claim [43] 34 wherein said carrier secures said [die] dice during use of said [die] dice after said [burn-in] testing and said carrier acts as a final package for said [die] dice.

46. (Amended) A method as in claim 34 further comprising[:] mounting a plurality of elongate, resilient electrical contact elements on contact pads of said [die] dice.

47. (Amended) A method as in claim 46 wherein said plurality of elongate, resilient electrical contact elements are mounted prior to depositing said [die] dice into said carrier.

48. (Amended) A method as in claim [47] 34 further comprising[:] applying a top on said carrier after depositing said [die] dice into said carrier.

49. (Amended) A method as in claim [47] 46 further comprising[:] mounting said carrier onto a substrate having a plurality of electrical contact pads.

50. (Amended) A method as in claim 49 wherein said carrier is mounted on said substrate prior to depositing said [die] dice onto said carrier.

51. (Amended) A method as in claim [50] 49 wherein said carrier is mounted on said substrate after depositing said [die] dice onto said carrier.

52. (Amended) A method as in claim 49 wherein each of said contact pads on said [die] dice are electrically coupled to a corresponding one of said plurality of electrical contact pads on said substrate through a corresponding one of said elongate, resilient electrical contact elements.

55. (Amended) A method as in claim 49 wherein said substrate is a test printed circuit board which is used [to test said die] in said testing.

56. (Amended) A method as in claim 49 wherein said substrate is a final package unit for said [die] dice.

57. (Amended) A method as in claim 49 wherein said substrate is used [to test said die] in said testing, and if said [die passes] dice pass said testing, said substrate is used to package said [die] dice for use.

58. (Amended) A method as in claim 57 wherein if said [die fails] dice fail said testing, said [die is] dice are removed from said carrier and [another singulated die is] other dice are deposited into said carrier.



59. (Amended) A method as in claim [35] 34 wherein said identification code comprises information identifying at least [one semiconductor wafer in] a specific processing lot of wafers in which the wafer from which said die was singulated was created, and wherein said method further comprises:

[exposing said die, while secured in said carrier, to a burn-in testing environment;]  
characterizing said [die] dice based on said [exposing] testing;  
reading said identification code.

61. (Amended) A method as in claim [59] 34 further comprising:

mounting, prior to said [exposing] testing, a plurality of elongate, resilient electrical contact elements on contact pads of said [die] dice;

mounting, prior to said [exposing] testing, said carrier onto a substrate having a plurality of electrical contact pads, wherein each of said contact pads on said [die] dice are electrically coupled to a corresponding one of said plurality of electrical contact pads on said substrate through a corresponding one of said elongate, resilient electrical contact elements.

63. (Amended) A method as in claim 61 wherein each of said elongate, resilient electrical contact elements is compressed less during said [exposing] testing than during final use of said [die] dice.

64. (Amended) A method as in claim 52 wherein each of said elongate, resilient electrical contact elements is compressed less during said [exposing] testing than during final use of said [die] dice.

65. (Amended) A method as in claim 52 further comprising removing said [die] dice from said carrier after said testing [said die] and packaging said [die] dice for use.